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AUTHOR	McGrath, Catherine H., Ed.
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ABSTRACT

The major issues surrounding the relationship between work and education now concentrate on the effects of education on productivity, on the effects of technology on the changing demand for education, and on the value of vocational education. In replacing the human capital theory of the value of education in the workplace, some recent theories hold that the major potential for education to increase productivity may be not in its job-specific training, but in its capacity to prepare persons to make decisions and to adapt to technological change. Although the common view holds that vocational students have better job market opportunities than others and that vocational schools reflect labor market demands, recent research contradicts both assumptions. Students in vocational programs, then, may be foregoing better preparation for the future work world. Like those about vocational education, two assumptions about the future of high technology education are also contradicted by available evidence: that the future will see fewer unskilled jobs and that the skill requirements of existing jobs will increase. Thus, a broad education is likely to be more, not less, important in a high technology future. (JW)

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EDUCATION AND WORK

Gears Driving the Economy

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The American educational system has long played an important social role in society, from advancing knowledge and culture to teaching the literacy that a modern and democratic society requires. In recent years, it has become increasingly clear that education plays an important economic role as well. Many students view education as a way to secure more challenging and rewarding jobs. Government underwrites a large share of the cost of schooling because education increases the productivity of the American work force and spurs economic growth.

The economic role of education may be even more important in the nation's future. All of the recent reports on America's educational system, including the report of the President's Commission on Excellence in Education, suggest improving education in order to help the U.S. enter the age of high technology and regain a competitive position in the world economy.

This widespread faith in education is based on several assumptions:

- the changing structure of the American economy and advances in technology raise the average skills required by workers in their jobs;
- the educational system is the most important source of skill development in modern society;
- the skills workers bring into the labor market will enhance their productivity in the workplace, benefiting workers, employers, and the nation.

In short, these assumptions suggest a positive and direct relationship between education and work.

Research, as well as observation, appears to support these assumptions. It is well known that workers with more education generally receive higher earnings and secure better jobs than workers with less education. And the prior expansion of education corresponded to a long period of economic growth and prosperity in this country. Yet a variety of evidence suggests that the relationship between education and work is neither simple nor straightforward. This issue of *Policy Notes* reviews some major issues and recent challenges surrounding this relationship.

Education and Employment

Most people believe that the American educational system has been quite successful in supplying the array of skilled and educated workers required by an advanced economy. While shortages and surpluses of certain types of workers such

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as teachers or engineers have always occurred, these are mostly short-term imbalances that generally involve only specific skill areas and relatively few people. Hence officials rarely view those imbalances with alarm.

Other observers point to a much more serious problem: the large discrepancy between the high level of education achieved by an increasing number of American workers and the educational requirements of their jobs. Research indicates that a large portion of the work force — perhaps 25-30 percent of recent college graduates — are overqualified for their jobs. Some claim that the problem has existed for some time and has grown increasingly widespread during the economic downturn of the 1970s. This situation not only has unfortunate consequences for those workers whose educational skills are underutilized in the workplace, but evidence suggests it may have contributed to the recent decline in the productivity of the U.S. economy.

The average education level of the American work force will continue to increase as more educated, younger workers replace less educated, older workers who retire. Already more than one-quarter of all young workers entering the labor market have completed four years of college.

Not only is the incidence of this problem widespread today, but it is likely to worsen in the future. The average education level of the American work force will continue to increase as more educated, younger workers replace less educated, older workers who retire. Already more than one-quarter of all young workers entering the labor market have completed four years of college. Whether the educational requirements of jobs will keep pace depends on the continued restructuring of the economy and the impact of technology. The challenge facing the nation is not simply to improve the system of education so that it can better meet the needs of a changing economy, but to make more effective use of the knowledge and skills that the educational system produces.

Education and Productivity

The assumption that education enhances productivity is rarely questioned. Most observers believe that the knowledge and skills students acquire in school — what economists have labeled human capital — make them productive workers. The more education individuals acquire, the more productive they become, and the more earnings they receive.

Yet recent evidence questions these assumptions. Test scores, a more direct measure of educational skills, show a rather weak impact on earnings. In addition, productivity growth in the U.S. economy has declined despite the population's rapidly increasing education levels.

Technology and the Changing Demand for Education

The demand for education in the labor market is influenced first by the changing structure of the American economy. Agricultural and manufacturing industries have generated a relatively smaller share of the new jobs over the last few decades, while service industries have accounted for an increasing share. Government has also provided a large share of the new jobs. Each of these changes has altered the occupational structure and the demands for educated labor. The resulting growth of professional and technical occupations has increased employment opportunities for college graduates. Employment in engineering, teaching, and a few other specific occupations has been especially strong over the last two decades.

The demand for education is also influenced by technology. Many people believe that technology has increased the demand for more educated and trained workers. They also believe that more advanced, sophisticated technologies — so called high technology — are likely to increase the demands for more skilled and educated workers in the future. Much of the renewed public interest in education stems from this belief. Yet at least some available evidence challenges these views and suggests that technology is likely to reduce the educational requirements of many jobs and increase the demand for low-skilled workers in service and clerical areas.

The Role of Vocational Education

What type of curriculum best prepares students for work? Some people believe that education should primarily instruct students in mathematics, English, and other academic subjects, with more specialized training reserved for advanced, postsecondary schooling or employers. A general education may be even more important for future workers since the specific skills of jobs are likely to change with rapid advances in technology. Others advocate a dual system of both academic and vocational education, with the latter providing students with more practical, job-oriented training as early as the high school level. Both types of education coexist in the United States, with vocational education expanding into the postsecondary level through the growth of community colleges.

Of course education has other purposes besides preparing students to become productive workers. It also prepares them to become more informed citizens, for example. Individuals and the educational system itself can pursue these goals simultaneously, but they can conflict. Students sometimes must decide between a course of study that holds more intrinsic interest and a course of study that holds more economic promise. School and government officials must balance their support between more traditional, academic programs and programs in the arts and nonacademic areas.

Recurrent Education

Educators and government officials influence the supply of educated workers in the market through their decisions about the level of public support and structure of education they provide. They must also consider ways of reforming the structure and finance of the educational system so that it better responds to the changing demands of the economy. Recurrent education is one reform being considered. Advocates argue that education should not simply prepare students to enter the workplace when they are young, but it should provide a source of training and retraining throughout their working lives. Recurrent education may become more important as the demands of work change in the future, requiring workers to continually acquire new skills throughout their working lives.

Technology is likely to reduce the educational requirements of many jobs and increase the demand for low-skilled workers in service and clerical areas.... Education has other purposes besides preparing students to become productive workers.

Each of these issues and the debates that surround them suggest a complex relationship between education and work. At a time when the nature of work is rapidly changing and the need for educational reform appears more urgent, a better understanding of this connection is required. ■

What is Learned and What is Earned: Education and Productivity

It has long been recognized that the economic productivity of both individuals and nations is related to their education. Economists have attributed a large portion of economic growth and the rise in living standards in the U.S. to the expansion of education. Spurred by a more educated work force, labor productivity grew at an average rate of about 3 percent a year for the quarter century following World War II.

Since 1970, however, productivity growth has slowed considerably, even becoming negative in the late 1970s, and rising only slightly in recent years. As world economic competition has become more intense, there is deep concern about future levels of productivity in the U.S. For this reason, many recent reports on education have proposed educational reforms intended to improve the economic productivity and competitiveness of the nation.

A decade ago, it would have been relatively easy to make recommendations on how to raise productivity through education. In those days the dominant view was that education increases "human capital" by providing skills that are valuable in production. Thus, the more education provided to an individual or nation, the higher the skills available to the economy and the higher its productivity. This view was supported by common observations that more highly educated individuals had better jobs and income, and that more highly educated nations had more advanced economies and higher standards of living.

In fact, the evidence seemed so clear that economists assumed a simple cause and effect relationship between education

More highly educated individuals had better jobs and income, and more highly educated nations had more advanced economies and higher standards of living.

and productivity, and focused their attention on measuring the economic returns to investments in education. Such returns were compared with other types of investments for varying degrees of profitability. Since education had both a cost and a return in the form of a higher income for the nation and the educated individual, it could be treated like any other investment. Generally, it was found that an investment in education was as profitable, or even more profitable, for the individual and society as investments in factories, equipment and other forms of physical capital.

In recent years the human capital explanation of education and productivity has not been consistent with much of the evidence. For example, it has been widely observed that over the past two decades, increasing numbers of educated workers have been relegated to jobs traditionally filled by persons with far less education.

Studies that have tried to relate education and productivity in particular jobs have typically found no relationship or even a negative one. Even when researchers have used direct measures of skills, such as test scores instead of years of education, to examine the connection between what is learned and what is earned, a weak relationship emerges. A recent study found that the difference in earnings between male high school graduates at the 50th percentile in test scores and at the 97th percentile was only about 10-20 cents an hour.

Alternative Views

There are alternative explanations of the link between education and productivity. One of them suggests that more highly-educated workers obtain higher incomes and better jobs because employers simply prefer to have a more educated work force. Another argues that although more education does not increase productivity directly, it does reduce the costs of on-the-job training, making such workers more attractive candidates for the best jobs. A third view is that education does increase productivity in the firm, but not through skills. Rather, it is argued that education inculcates in workers the appropriate personal views, behaviors, expectations, and values that enable control and motivation of the work force at each level of work organization. A fourth explanation argues that although education may not increase the productivity of workers, it represents a selection system in which those workers who are most productive are identified for placement in appropriate jobs.

Perhaps the most intriguing analysis is that suggested by Nobel prize winning economist T.W. Schultz, considered to be the father of human capital theory. In the last decade he has argued that the major potential for education to increase productivity is in its capacity to prepare persons to make decisions and to adapt to technological change. Narrow skill training only qualifies individuals to perform in a well-defined job role, explains Schultz. However, many of the gains in productivity will be made by adapting to rapid technological change. Workers will have to shift from older to newer, more

The major potential for education to increase productivity is in its capacity to prepare persons to make decisions and to adapt to technological change.

productive technologies, a movement that is currently a major concern in the U.S.

In addition, Schultz points to the need for workers to make better decisions on the use of materials, resources, their own labor time, and the time of other workers. These decisions must integrate workers' efforts into the overall organizational operation rather than toward a few simple and repetitive tasks. Schultz and others have argued that both decisionmaking skills and adaptation to technical change are key aspects for increasing productivity in individual enterprises and the economy. A more educated labor force is likely to be more technologically adaptable and to make better allocative decisions.

According to this explanation, the ability to take advantage of educated labor to raise productivity will depend upon the nature of jobs. Jobs must be designed to enable educated workers to use their abilities to adjust to technical change and to improve the efficient allocation of resources in the organization. These conditions imply that individual initiative and worker participation in the decision process of the firm are central to improving productivity with a more highly educated workforce.

Strong support for this proposition has been provided by experiments in worker participation and job redesign to expand worker involvement. These experiments suggest that substantial improvements in productivity and quality control result

when the organization of the enterprise fosters greater worker involvement in both the daily decisions of production as well as the more far-reaching ones affecting hiring, training, equipment, and work processes. These situations illustrate that not only can firms benefit from greater worker participation in decisionmaking, but also workers tend to be more highly motivated and committed as evidenced by lower employee turnover and absenteeism.

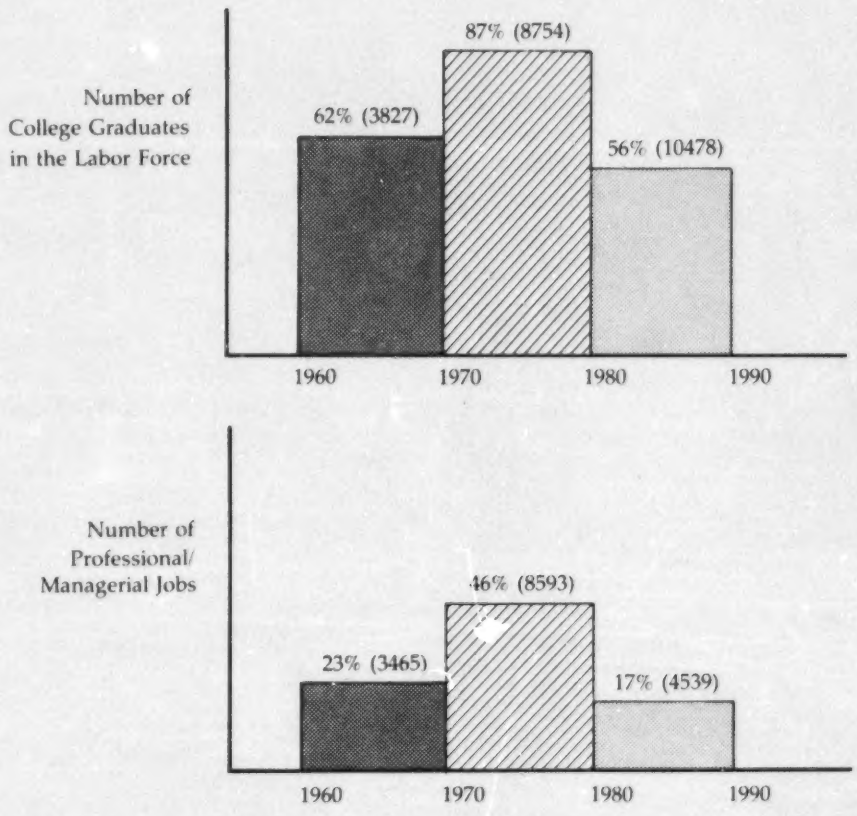
The Dominant Trend

Despite the promise of these experiments, the dominant historical trend has been in the opposite direction. Over time there has been a tendency for jobs to be reduced to routine and repetitive operations that do not provide human challenge nor the ability for educated workers to use their insights and judgements. Instead, jobs at virtually all levels have become more restricted and controlled.

Much of the application of high technology seems to also push in this direction. For example, secretarial positions are displaced by word-processing pools and clerical operations are replaced by automated data files in which operators are monitored for productivity according to the number of key strokes or other narrow measures of performance. Not only do these changes remove challenges and room for human judgements in decisionmaking, but they tend to increase worker dissatisfaction. Both may have a restrictive effect on productivity and make it difficult to benefit from a more highly educated work force.

No matter how well the educational system prepares its participants, the effects of productivity must be limited by the ability of the workplace to capitalize on education. Although the educational system must constantly be evaluated according to its efficiency in preparing a capable work force, there must be an increasing focus on the nature of work enterprises and their ability to benefit from a more highly educated group of workers. At the present time there is probably a large loss of productivity and economic ou.put because of the underutilization of educated workers. Fortunately, a substantial experience and research literature has been amassed in recent years on both the ways to expand worker participation and to improve job design to take advantage of an educated work force and raise its productivity. To a large degree the future effects of education on economic productivity will depend as much on what happens to the organization or the workplace as it does on what happens to schools and universities. ■

Growth Rates for College Graduates in the Labor Force and Professional/Managerial Jobs, 1960-1990



Note: In the past, only three out of four college graduates have found professional or managerial jobs. In 1980 this proportion dropped to 60%.

Source: Rumberger, "The Job Market for College Graduates, 1960-1990," IFG Project Report 83-A3.

briefly...

Consulting editor for this issue of *Policy Notes* is Russell W. Rumberger, a senior research associate at IFG. Rumberger, along with Henry M. Levin, coordinates IFG's research program on postsecondary education and the labor market, and contributed the introductory article for this issue, "Education and Work: Gears Driving the Economy."

Henry M. Levin wrote "What is Learned and What is Earned: Education and Productivity" and co-authored "Silicon Chips and French Fries: Jobs in a High Tech Future" with Rumberger. Levin is director of IFG and a professor in the Stanford School of Education.

"Voc Ed or College Prep? Opening the Door to Work" is based on two lengthier papers published by IFG: "Occupational Demand and the Rise of Postsecondary Vocational Education," by W. Norton Grubb, a professor at the Lyndon B. Johnson School of Public Affairs at the University of Texas, Austin, and "The Economic Value of Academic and Vocational Training Acquired in High School," by Rumberger and Thomas Daymont, an assistant professor in the Department of Industrial Relations and Organizational Behavior, Temple University.

The illustration on the first page is the work of Barbara Mendelsohn of Stanford's News and Publications Office.

VOC ED OR COLLEGE PREP? OPENING THE DOOR TO WORK

One of the traditional functions of schooling has been that of preparing individuals to enter the labor force. Benjamin Franklin believed that education should produce individuals "fitted for learning any business, calling, or profession," and, in 1851, William Harris and Duane Doty wrote that schooling must encourage "habits necessary through life for successful combination with one's fellow-men in an industrial and commercial civilization." Yet educators have been unable to agree on what type of education provides the best preparation for work.

Both academic and vocational curricula are offered at secondary and postsecondary institutions in the U.S. Academic programs provide instruction in language arts, foreign languages, mathematics, natural sciences, and social sciences, while vocational programs provide job-related training in such areas as agriculture, marketing and retailing, health, home economics, office work, and technical trades. Proponents of the traditional academic curriculum claim that its focus on general skills provides students with a well-rounded education, broad occupational choices, and a solid foundation upon which later specific training can take place. Supporters of vocational education argue that training in specific skills provides a more practical transition into the workplace and notable economic payoffs.

Vocational programs first found a foothold in secondary schools during the early 1900s, and have increased in importance since then. More recently, vocational education has expanded into the postsecondary level, particularly in community colleges. While enrollment in four year institutions grew by 12 percent in the 1970s, community college enrollment grew a remarkable 90 percent, with much of this growth occurring in vocational programs. Thus postsecondary education has become increasingly vocational in orientation.

Research Results

This growth has occurred despite the lack of solid evidence that individuals with vocational training enjoy an economic advantage over those with an academic background. In a recent study published by IFG, Russell Rumberger and Thomas Daymont examined the economic benefits of academic and vocational education at the secondary level. They addressed the limitations of past studies by analyzing differences in the actual courses taken by high school students and by including an assessment of whether a student's vocational training was used on the job.

Rumberger and Daymont found that, for both women and men, academic and vocational training showed equally strong effects on different dimensions of labor market behavior. In other words, more education, whether academic or vocational, has similar positive relationships with hourly earnings and hours worked per year, and negative relationships with weeks unemployed per year. Further, vocational training that is part of a specific program has a greater impact on labor market outcomes than vocational training in unrelated areas. Finally, the payoff to vocational training is higher for persons employed in jobs where their training can be used. Rumberger and Daymont concluded that, for some students and in some areas, such as women in office occupations, vocational preparation produces superior labor market effects than academic training. In other cases, it does not.

Students in vocational programs are foregoing academic preparation that may better prepare them for a rapidly changing, future work world.

Of course this analysis only examined the economic benefits of high school training during the first few years after high school. The economic advantage of one curriculum relative to another can only be ascertained through comparisons over a longer period. Other studies provide inconclusive evidence about the long-term benefits of vocational education. Studies have found that the economic payoff to various types and levels of education vary widely, so that it is difficult to conclude that one type of education, whether in a vocational or an academic area, is generally superior to another.

A related issue concerns the advantage of vocational training acquired in high school versus vocational training acquired in postsecondary institutions. To the extent that vocational training in high school precludes coursework in academic subjects, then students in vocational programs are foregoing academic preparation that may better prepare them for a rapidly changing, future work world. Recent surveys of employers indicate that they seek new employees with a sound education and good work habits rather than narrow vocational skills.

Still another issue relevant to vocational education is the extent to which school vocational offerings reflect specific labor market needs. An IFG paper by W. Norton Grubb addresses this issue at the postsecondary level. Grubb compared both community college enrollment and degrees awarded with the growth rates of specific occupations. He found that vocational enrollment grew by 33 percent between 1972 and 1979, while employment related to those fields of study grew by only 15 percent. Similarly, the granting of associate and other two year vocational degrees grew by 60 percent between 1972 and 1979, while jobs in related areas grew by a more modest 12 percent.

Therefore, enrollment increases in a large number of occupational areas have substantially outweighed demand as measured by occupational growth. Changing enrollment patterns also show a shift toward vocational programs aimed at white-collar occupations such as retailing, marketing and office occupations, and away from those leading into trade and technical occupations. Surprisingly, the growth in degrees and enrollments in emerging high tech areas, like computer and health technologies programs, is solid but not spectacular.

Conclusions

Overall, the results of these studies tend to weaken two of the conventional endorsements of vocational education. Students who follow a vocational curriculum in secondary school do not seem to have an advantage in labor market opportunities over other students, nor do postsecondary vocational offerings reflect labor market demands.

This is not to say that vocational education has no value. Vocational education may affect subsequent training opportunities and the economic benefits that accrue from them. It may also be keeping students in school who might otherwise drop out. Furthermore, vocational education may provide benefits outside of the labor market, such as craft and management skills useful in the home. Therefore, any assessment of vocational education, or any educational program for that matter, must look beyond narrow economic benefits and include a review of both costs and educational benefits. ■

Silicon Chips and French Fries: Jobs in a High Tech Future

High technology has become the impetus for educational reform in the 1980s. Business leaders and government officials proclaim that economic recovery and leadership in the international marketplace will be based on the use of computers, robots, and biotechnology. But they tell us that in order to realize this future, we must have adequate numbers of workers properly trained to use these sophisticated technologies.

Already more and more workers are learning and using the new skills necessary to operate computers in their jobs. As robots take over many of the most menial tasks, fewer low skilled jobs will be available for future workers. The challenge for the educational system is to upgrade the scientific, technical, and computer knowledge of the entire labor force and to provide sufficient numbers of highly-trained technical and scientific personnel for technological leadership.

This challenge has spurred the educational community into action. Parents and educators are calling for expanded programs of computer training in the schools. School officials are rushing to equip classrooms with computers. The federal government has recently passed legislation to bolster teaching in mathematics and science. And many states are vigorously pursuing ways to increase the number of science and mathematics courses required of all high school graduates to ensure an adequately trained labor force for high tech industry.

The crucial role of education in this high technology future is based on two assumptions. First, it is assumed that job expansion in a high technology era will reduce or even eliminate opportunities for unskilled workers. Future jobs will require considerable education and sophisticated training in computer-related areas. The second assumption asserts that the use of high technology will upgrade the skills requirements of existing jobs through the increasing use of computers and related products. Present employees will be displaced if they do not acquire more sophisticated skills, and the young are advised to take plenty of science and mathematics courses if they wish to have future employment prospects.

The Evidence

Despite the popularity of these assumptions, they are contradicted by the available evidence. The field of high technology is not the one in which most new jobs will be found nor will the use of high technology require a vast upgrading of the skills of the American labor force. To the contrary, the expansion of the lowest skilled jobs in the American economy will vastly outstrip the growth of those in high technology areas. Furthermore, the proliferation of high technology industries and their products is far more likely to reduce the skill requirements for jobs in the U.S. economy than to upgrade them.

U.S. Department of Labor projections indicate that the economy is expected to generate a 22 percent increase in the number of jobs between 1978 and 1990. Jobs for computer systems analysts, data processing machine mechanics, and computer programmers are projected to grow between 74 and 148 percent. However, the percentages can be misleading. The *total* number of jobs generated in these and other high technology job areas is expected to be relatively small in comparison with such unskilled job categories as janitors, nurses' aides, fast food workers, and kitchen helpers. In fact, no job within high technology fields even makes the "top 20" in terms of total numbers of jobs added to the U.S. economy.

While 150,000 new jobs for computer programmers are expected to emerge during the 12 year period 1978-1990, some 1.3 million new jobs are projected for janitors, nurses' aides, and orderlies: 9 unskilled jobs in these categories alone for every computer programmer. New jobs for data processing machine mechanics will increase 148 percent, the fastest growing job category. But that large percentage gain translates into a total increase of less than 100,000 new jobs, while some 800,000 new jobs are projected for fast food workers and kitchen helpers.

Employment and Employment Growth in the Fastest Growing Occupations: 1978-90

	Employment Growth 1978-90	
Occupations	*Percentage Increase*	*Number of Jobs*
Fastest relative growth[a]		
1. Data processing machine mechanics	148	93,000
2. Paralegal	132	38,000
3. Computer systems analysts	108	199,000
4. Computer operators	88	148,000
5. Office machine and cash register servicers	81	40,000
Total	**105**	**518,000**
Fastest absolute growth[b]		
1. Janitors and sextons	26	672,000
2. Nurses' aides and orderlies	55	594,000
3. Sales clerks	21	591,000
4. Cashiers	36	545,000
5. Waiters/Waitresses	35	532,000
Total	**31**	**2,934,000**
Total, all occupations	**23**	**21,980,000**

[a]Based on the percentage increase in the number of jobs created
[b]Based on the number of jobs created
Source: Levin and Rumberger, "The Educational Implications of High Technology," IFG Project Report 83-A4.

Clearly, new jobs in high technology fields will not dominate the job growth picture in the foreseeable future. However, vast segments of the labor force will certainly find their jobs altered by sophisticated computer technologies. Secretaries will work with word processing equipment; bookkeepers will use computerized, financial spread sheets; clericals in purchasing and inventory will apply their skills to automated and computerized record systems; mechanics and repair persons will use diagnostic equipment employing mini-computers; and telephone operators will rely on computerized directories.

While work tasks will surely change with the use of these new technologies, there is little evidence that they will require workers to have more sophisticated skills. To the contrary, studies in a wide variety of occupations suggest that the new technologies provide opportunities to further simplify and routinize work tasks and to reduce the opportunities for worker individuality and judgement. In such diverse areas as office work, data processing, drafting, wholesale and retail trade, and computer programming, evidence suggets that micro-computers are making it possible to utilize persons with lower skills to perform highly sophisticated functions.

Using computers does not necessarily require computer skills. The new generation of office computers is specifically designed so that "no special computer skills are needed." The latest word processors can correct typing errors automatically by the use of electronic dictionaries, so letter-perfect typing and strong spelling skills are no longer required of individuals. Large numbers of workers can be placed into word processing pools to enter data from dictated transcriptions endlessly. Each operator's output can be monitored by the computer so that supervisors can compare productivity among workers instantaneously.

In fact, the increased use of high technology in the workplace may eliminate more jobs in the future economy than it creates. Robots alone could eliminate up to 3 million operative jobs in the next 20 years, and recent estimates show that only one job is created in the production and maintenance of robots for every 3 jobs that are eliminated. Contrary to the general impression, technology will not simply eliminate the most boring and repetitious jobs; employers are more likely to use less costly, available technology to eliminate more skilled jobs that pay higher wages.

Though many workers will need to acquire new knowledge to adjust to technological change, it is more likely that they will have to learn different skills rather than more demanding ones. Certainly word processing requires some skills that differ from those required for typing. However, most of these new skills can be acquired through on-the-job training and short training courses rather than an expanded foundation in science, mathematics, and computer programming.

Thus the general educational requirements for creating good citizens and productive workers are not likely to be altered significantly by the use of high technology. Yet education still has an important role to play in preparing students for a future society and economy that is bound to be more complex and highly technical than today's. To be able to adapt to that future will require a good basic foundation in logic, analytical reasoning, scientific knowledge, and communicative skills. Such skills would provide students with the basis for learning new, job-specific skills in the future as the needs arise.

A rapidly changing future also dictates that students be better prepared to participate in the social and political life of their community and nation, to understand the major issues facing that society, and to engage in productive discourse. This will require an extensive knowledge of the social and economic institutions of society, as well as technology and science. To a large degree the requirements for good citizenship are consistent with the educational foundation for work preparation. In other words, since education affects society in many ways other than merely economic, a solid, basic education is likely to be more and not less important in a high-technology future. ■

IFG Papers

A number of IFG papers investigate the link between education and work, and may be ordered from IFG. Please include payment with all orders.

82-A23 THE ECONOMIC VALUE OF ACADEMIC AND VOCATIONAL TRAINING ACQUIRED IN HIGH SCHOOL
Russell W. Rumberger, Thomas Daymont
$2

82-A26 RACE AND EDUCATIONAL EMPLOYMENT
Craig Richards, Dennis J. Encarnation
$3

82-B7 THE STRUCTURE OF WORK AND THE UNDERUTILIZATION OF COLLEGE-EDUCATED WORKERS
Russell W. Rumberger
$2

82-B8 EDUCATION AND WORK
Henry M. Levin
$2

83-A2 SOCIAL MOBILITY AND PUBLIC SECTOR EMPLOYMENT
Russell W. Rumberger
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83-A3 THE JOB MARKET FOR COLLEGE GRADUATES, 1960-1990
Russell W. Rumberger
$2

83-A THE EDUCATIONAL IMPLICATIONS OF HIGH TECHNOLOGY
Henry M. Levin, Russell W. Rumberger
$2

83-A8 A CONCEPTUAL FRAMEWORK FOR ANALYZING JOB SKILLS
Russell W. Rumberger
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83-A9 OCCUPATIONAL DEMAND AND THE RISE OF POST-SECONDARY VOCATIONAL EDUCATION
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Russell W. Rumberger
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83-A14 EDUCATION, UNEMPLOYMENT, AND PRODUCTIVITY
Russell W. Rumberger
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An introduction...

IFG is pleased to welcome Milbrey McLaughlin as the new Associate Director of IFG. She will replace Jay Chambers, who will continue at IFG as Senior Research Associate and Senior Economist. Chambers, the Associate Director since IFG's inception in 1978, was particularly crucial in helping to establish IFG's initial research and publications programs. His resignation will allow him to devote more time to research.

Milbrey McLaughlin recently joined the faculty of the Stanford School of Education as an Associate Professor and Director of the Evaluation Training Program. Prior to Stanford, McLaughlin was a Senior Social Scientist at The Rand Corporation, specializing in the implementation of planned change and intergovernmental relations in education. During her 11 years with Rand, McLaughlin directed many research projects including one focusing upon differences in state strategies to improve local education quality and another examining the response of nine states to fiscal retrenchment and federal block grants. McLaughlin is especially noted for her evaluation of Title I of the Elementary and Secondary Education Act of 1965.

At IFG, McLaughlin will develop research programs on teacher evaluation and educational governance. One of her initial projects involves tracking California's new educational regulations. She hopes to introduce more projects focusing on the implementation of planned change and intergovernmental relations to IFG's research agenda.

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Policy Notes welcomes your comments and suggestions. For additional information regarding IFG, copies of papers listed herein, or the announcements of past and future IFG publications, please contact:

Sandra Kirkpatrick
Assistant Director for Dissemination
IFG — CERAS Building
Stanford University
Stanford, Calif., 94305-1691
(415) 497-2754

POLICY NOTES

Catherine H. McGrath ..... Editor
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STANFORD UNIVERSITY
INSTITUTE FOR RESEARCH ON EDUCATIONAL FINANCE AND GOVERNANCE
CERAS Building
Stanford, California 94305-1691
(415) 497-0957

IFG